Example H: Spec($\mathbb{Z}[X]$). This is a so-called "arithmetic surface" and is the first example which has a real mixing of arithmetic and geometric properties. The prime ideals in $\mathbb{Z}[X]$ are:

i) (0),

ii) principal prime ideals (f), where f is either a prime p, or a $\mathbb{Q}$-irreducible polynomial written so that its coefficients have g.c.d. 1,

iii) maximal ideals (p,f), p a prime and f a monic integral polynomial irreducible modulo p.

The whole should be pictured as follows: